

Vol. 5, No. 4

March, 1936

JOURNAL
OF THE
NEW ZEALAND INSTITUTE
OF
HORTICULTURE

CONTENTS.

	Page.
A Brief History of the Royal Horticultural Society: by T. Waugh, N.D.H. (N.Z.)	66-77
The Lachenalia and its Vegetative Reproduction: by M. J. O'Sullivan, B.Sc.	78-88
Summary of Proceedings Thirteen Annual Confer- ence	89-94
Institute Notes	94
Examination Papers	95-101

Edited under the authority of the Executive Council of the Institute.

EXAMINATIONS.

Examinations for the following are conducted by the Institute:—

- 1. Junior Certificate in Horticulture.**
- 2. Intermediate Certificate in Horticulture.**
- 3. Diploma in Horticulture.**
- 4. Second-class Certificate in Fruit-culture.**
- 5. National Certificate in Fruit-culture.**
- 6. Seedsman's Certificate.**
- 7. Certificates in Florists' Art.**

EXAMINATION PAPERS.

Sets of examination papers used at the last six examinations in horticulture are obtainable on application for sixpence per examination set.

**Address all correspondence to:
Dominion Secretary,
N.Z. Institute of Horticulture,
Box 1237,
Wellington.**

Journal of the New Zealand Institute of Horticulture

Vol. 5.

WELLINGTON, MARCH 1936.

No. 4.

A BRIEF HISTORY OF THE ROYAL HORTICULTURAL SOCIETY.

The Banks Lecture for 1936

By THOMAS WAUGH, N.D.H. (N.Z.)

In the following historical notes I have endeavoured to select items and facts which may be of interest to horticulturists, they are gleaned from various publications of the R.H.S. in my possession. The hope is expressed that they may prove interesting and even helpful, in showing the members of our own Institute that even the greatest Horticultural Society in the World began in a very humble way and that its course has not always been a smooth one, but in spite of many vicissitudes, to-day it has a membership of over 30,000. Also that all Horticulturists in this fair land should take the R.H.S. as their standard in all matters.

The Horticultural Society of London was formed in 1804. The idea of such an Association originated with Mr. John Wedgewood (of Wedgewood ware fame) who on the 29th June, 1801, wrote to Sir Joseph Banks proposing the formation of a horticultural society whose object should be "to collect every information respecting the culture and treatment of all plants and trees as well culinary as ornamental, to publish transactions treating of horticultural subjects of the same size and form as the transactions of the Adelphi Society, and to give premiums for improvements in horticulture."

To this proposition Sir Joseph Banks replied on the 31st July 1801 as follows: "I approve very much of the idea, I know of no trade that conceals so many valuable branches of knowledge as that

of a gardener and few subjects where the public will be more benefited by the disclosures which such a society will immediately occasion. I shall be flattered if the gentlemen who are to arrange the plan do me the honour to set me down as an original member." On this suggestion the plan was proceeded with, a meeting was held in Mr. Hatchard's house in Piccadilly, London, on March 7th, 1804 and the Society was then founded. The list of original members included all who in those days were most distinguished by their knowledge of horticulture. The Council consisted of 21 members, a President and six Vice-Presidents.

The records of the early history are meagre, it appears that in 1805 the meetings were transferred to the house of the Linnaean Society in Soho, the Horticultural Society paying £25 per year rent and engaging Mr. Price the clerk of the Linnaean Society, to act as their clerk also, at a salary of £20 per annum. The original members numbered 59. In 1805—29 new members were elected, in 1806—17. In 1807 only 10. In 1808 eight. No papers were published until the year 1810.

In 1809 a Charter was obtained which altered the constitution of the Council into fifteen members consisting of a President, four Vice Presidents, Treasurer, Secretary and eight others.

The acquisition of the Charter, the retirement of Sir Joseph Banks from the Council, the death of the Earl of Dartmouth, the election of Mr. Thomas Knight as President in his place were nearly simultaneous events. We may suppose that Sir Joseph Banks' services had been of great value to the Society, hence the portrait of him preserved on the walls of the Council room. The most important of all these events was undoubtedly the election of Mr. Knight as President. We are told he was the most experienced practical gardener as well as scientific experimentalist of his day. For 27 years he held the office of President during which time he seems to have been the ruling spirit in all things. Mr. Sabine had been appointed Secretary to take charge of the correspondence and the business part of the affairs.

In 1810 the first volume of the Transactions was published and from that period until his death in 1837 Mr Knight seems to have written a multitude of articles for the Transactions, the index shows no less than 139 articles contributed by him. The volumes were published in the most costly style, illustrated with coloured engravings. Each Fellow received a free copy and they were sold to the public at a high price. Ten volumes were published in all, and their total cost was then found to have amounted to £25,250, or about £2500 each volume. They were discontinued in 1848.

In 1816 some order was put into the affairs of the Society. By-laws (for the first time) were passed and the conduct of the business was assimilated to that of a public office and a balance sheet was published.

The number of Fellows continued to increase and by the year 1818 things looked prosperous and an experimental garden was established at Kensington with an auxiliary Nursery at Ealing. About this time the Society began the system of procuring seeds and plants from abroad and distributing them to Fellows. Plants were first sent from China by Mr. John Reeves, then the Society sent out collectors of its own. The house in Regent Street was bought for £4200 and became the focus of Horticulture in Europe. The subscription was raised from £2/2/- to £3/3/- a year and the admission fee from £3/3/- to £5/5/- and in 1821 there were 328 elections.

Stimulated by the prosperity, the Society took a lease from the Duke of Devonshire of the grounds at Chiswick, and abandoned those at Kensington and Ealing. The land was 33 acres in extent, rental £300 a year with a fine of £450 every thirty years. The lease to be forever. A voluntary subscription list was opened to defray the cost of forming the garden. £7275 was subscribed but this fell far short of the sum required. At the same time the subscriptions were again raised, the admission fee from £5/5/- to £6/6/- and the annual subscription from £3/3/- to £4/4/-. About this time it would appear the maximum profitable height had been reached, as the elections decreased year by year though the expenses kept on increasing instead of decreasing. It was about this period that the most valuable explorations and collecting were done. Don, Potts, Forbes and Parkes had sent home many new varieties of plants from the East Indies and the Cape, and Douglas was sent to collect in North West America. Registers of the barometer, thermometer, hydrometer and rain gauge were established at Chiswick.

At this time too the Horticultural Society achieved its first celebrity as a fashionable institution. Breakfasts were established, to which the privilege of purchasing tickets at the price of £1/1/- (£2/2/- on the last day) was to be had only through the vouchers of a number of lady patronesses. Large sums were thus drawn in but large sums had to be spent to provide suitable entertainment so that very little advantage accrued to the finances of the Society, for example, on the large sum of £4760 received in 1828 there was a loss of £139, and out of £5785 received in 1829 the whole profit was £22.

In 1830 a crisis occurred which had an important influence on the affairs of the Society. Dr. Lindlay had been appointed assistant Secretary and the value of his services and extent of his power had been speedily recognised for in November 1826 he was appointed to the double office of assistant secretary at Chiswick and assistant secretary in London. He entered on these duties at a critical time, very large expenditure had been incurred at Chiswick, £16,464 had been sunk there in permanent works and the cost of maintenance during the eight years the garden had been in existence had exceeded the amount of all separate subscriptions and garden revenue by £29,000. The expenses had gone on increasing, the receipts diminishing until the affairs of the Society began to look so black that the Council appear to have become frightened at their

aspect. After May 1826 they ceased to lay any statement of their affairs before the annual meeting of the Society.

In February 1830 a committee of enquiry was appointed to investigate the management and they found a debt of £20,243. They condemned the practice of keeping the Society in ignorance of its financial position and expressed an unfavourable opinion of the manner in which the Society had been conducted, making very liberal acknowledgment of the services rendered to horticulture during the period.

The result of the report was the resignation of the Secretary (Mr. Sabine), the reconstruction of the Council and the revision of the whole system of management. During this period Dr. Lindlay was making rapid strides towards the eminent position as a scientific botanist which he subsequently attained, the Council accepted his views and with him rested the whole management of the Society. During the following years efforts seem to have been made to reduce the debt, by reducing expenditure; on a £20,000 indebtedness this was slow work. An increase of revenue was what was wanted and Dr. Lindlay found the means of procuring it. He introduced the system of garden exhibitions or flower shows (as we know them) which have since become so popular throughout all the world. The first idea was three special exhibitions held in 1832 in the house in Regent Street, horticulturally successful, though financially of very little benefit. In 1833 it was resolved to transfer the Exhibitions to Chiswick, giving free admission to members and charging a moderate price for tickets to the public. The experiment was successful, the exhibitions were popular; the idea was new and good and it rapidly found favour in the eyes of the public. It grew and the Horticultural Society profited by it. The number of elections began to increase, in the first year a considerable profit was made and for many years afterwards the flower shows produced an important part of the annual income of the Society. The Duke of Devonshire, who had succeeded Mr. Knight as President in 1839 added a great attraction to the Exhibitions by throwing open the grounds of Chiswick House to visitors to the Shows. From a report of the Council to the Society it appears that the Exhibitions had yielded about £43,000 clear profit whilst about £20,000 had been distributed in medals and pecuniary rewards.

The gardens and hot houses, orchid houses, orchard and orchard houses were all kept up in the highest efficiency. Collectors were sent abroad. Mr. Douglas had resigned and left North West America for the Sandwich Islands on his way home but unfortunately lost his life by falling into a pit dug for wild cattle.

Mr. Fortune was sent to China in 1842, this proved the most successful expedition undertaken by the Society. The publication of the transactions was relinquished in 1848. It was at this period that considerable efforts were made to advance the education of gardeners at Chiswick; a system of teaching was established, evening lectures were delivered by Dr. Lindlay, examinations instituted

and reading rooms established. The flower shows in the meantime had merged into open air entertainments but when the weather was bad the income suffered and we find the indebtedness again increasing. The publication of the Journal was suspended, the Society's landlord, the Duke of Devonshire kindly remitted £100 per year of the rent of the garden, the collectors were recalled from abroad, the orchid house was given up and the orchids sold for £569, and the Herbaria of the Society comprising the original specimens of the species sent home by the Society's collectors, were broken up and sold for £253. A sacrifice on the part of the Society but fortunately for Science they were bought for Kew, where they can still be consulted, and where they are secure from the casualties, such as those now described. Affairs at this time were very discouraging, the Council laid matters before a general meeting of the Fellows and obtained the assistance of a committee of the Fellows to aid them in their deliberations and together they arrived at the conclusion that the garden at Chiswick must be relinquished and the future operations of the Society confined to the encouragement of Horticulture by such means as could be conducted without it. Special meetings of the Society were held to consider what should be done, when, after much discussion, it was resolved to make an effort to preserve the garden at Chiswick which by many was thought as tantamount to the Society itself.

It was thought that £5000 would relieve the position; actually £3267 was raised by subscriptions, and the Council immediately spent this amount in beautifying Chiswick under the direction of Mr. McEwen, a gardener of eminence who was appointed to the new office of sole superintendent of the Garden. Chiswick was now in the greatest beauty and the debt of the Society remained exactly as it was. A considerable increase in Fellows took place in 1856, when 300 were elected. The position of the Society, however, notwithstanding the large subscriptions and the general encouragement it received, as indicated by the increase of Fellows in 1856, was still so precarious that a general meeting held at this time gave the Council power "to take such measures for the reorganisation of the Society as they might consider advisable even though these measures should involve the relinquishment of the garden at Chiswick and the realization of the property or any part of the property therein."

In 1857 the Council resolved to try and revive the flower shows at Chiswick and also held a Fruit Show in November 1857. In the next year three great meetings were held, in St. James Hall, London. One of these was an evening meeting which in addition to the loss to the Society, entailed a serious loss to many of the exhibitors, their plants having been ruined by the gas and want of ventilation. In 1857 Dr. Lindlay resigned the paid office of Vice-Secretary and was appointed to the honorary office of Secretary. The offices of the Society were removed to Mr. Small's rooms in St. Martin's Lane and the staff reduced to a minimum. It was now a question of saving the Society and this was done by several of the wealthy

and zealous members of the Society becoming personally liable. On the death of the Duke of Devonshire in 1858 His Royal Highness the Prince Consort consented to accept the office of President and speedily turned his practical mind to the best mode of getting the Society out of its difficulties and of promoting the Science whose mission it was to foster. After the successful termination of the Great Exhibition in 1851 a considerable sum of money remained in the hands of Her Majesty's Commissioners of whom His Royal Highness was chairman. The money had been profitably invested in the purchase of a large estate at Kensington Gore, near the site of the Exhibition of 1851 and His Royal Highness's scheme was to reserve a considerable quadrangular space in the centre of the estate for Government buildings, relating to Science and Art, which might afterwards be built upon it, that these should be built around the plot, leaving a large open space in the centre. It occurred to His Royal Highness that this open space might suit the Horticultural Society, and a proposal was made, with his sanction, at the Anniversary meeting in May, 1859, for their leasing the space in question from the Commissioners and turning it into a Horticultural Garden in which architecture and statuary should also be introduced.

The proposal was adopted and an arrangement was entered into between the Society and the Commissioners, out of which sprang the garden at South Kensington. The chief terms of the arrangement, when finally adjusted, were that the Commissioners, as landlords, should surround the ground with handsome Italian Arcades open on the inner side and that not less than £50,000 should be expended by them for this purpose and the Society was to expend a like sum on the gardens, and the Society to pay an annual rental of £2145 with the addition of half the profits. But when no profit was made no rent was payable, with a proviso that should this happen for five successive years the lease might be forfeited to the Commissioners. So plausible was the idea that the Society not only raised the £50,000 but expended a further sum of £23,000 in making the garden. Under the patronage of His Royal Highness the number of Fellows rapidly increased and money flowed freely in, and put the Society in funds sufficient to pay off any balance remaining of the old debt and to allow another £20,000 to be expended on the gardens.

On the 1st of May 1858 the number of Fellows was 985, two years after 1500, and by 1864 the number was 3350!

In the year 1861 a new charter was obtained and Her Majesty the Queen graciously commanded the Society henceforward to assume the title of the Royal Horticultural Society. It was in this year that the first Fruit and Floral Committees were appointed, and the publication of "Proceedings" was commenced. On the 5th of June, 1861, the new gardens were opened with much ceremony; though deprived of the presence of the Queen, owing to the recent death of Her Majesty's mother, Her Royal Highness the Duchess of Kent. His Royal Highness as President, planted a tree and per-

formed the opening ceremony. His Royal Highness's address on the occasion was a very happy and memorable one, for it showed very clearly the great interest he took in the science and art of Gardening.

The Prince's plans for combining the interests of Art and those of the Society, were being quietly matured and the decorations of the gardens proceeding satisfactorily when the blow fell which desolated the Queen, laid the nation in mourning and paralysed the Horticultural Society. On the 14th December, 1861 the Prince Consort died. It was some time before the full extent of their loss could be realised by the Society, the Council knew what the Prince's plans were and endeavoured to carry them out. The most notable horticultural feature of the year 1862 was the holding of the International Fruit Show in October to which we are told foreign countries and our own Colonies contributed. By the year 1863, the impetus which the Prince had given to the Society began to slacken, the garden was unfinished and the master mind had gone.

The two outstanding events in 1863 were the ceremony of uncovering the memorial to the Prince in the Gardens, and the holding of a series of exhibitions in the Arcades, which by this time had been glazed and warmed. The result of the new work would place the shows of the Society beyond the accidents of bad weather as they could then be held under complete shelter and with a scientific arrangement. The principle kept in mind with these improvements was to enable the Fellows and the public to see at any time a display of horticulture in its daily and interesting changes, and to make these gardens the headquarters of horticulture in the country.

At the beginning of 1864 the Commissioners of the 1851 Exhibition were in a position to resume the works in the gardens and they agreed to spend a further £13,000 on them. They also allowed the Society the temporary use of the ground lying on each side of the garden and on which had been erected the Annexes of the Exhibition of 1862.

The Chiswick garden quickly grew in favour and was the scene of some of the Society's most extravagant festivities and garden fetes, which were on a most extensive scale from 1827 to 1857. Very large sums of money were received but large sums had to be expended to entertain such company. When all was paid for very little profit was left.

The Kensington Garden, separated by Kingston Road from Hyde Park and bounded on the east by Exhibition Road, on the west by Prince Albert Road, on the south by Cromwell Road, occupied an unique position, the whole surrounded by Arcades opening towards the gardens; at the northern end was the large Conservatory. The site had a fall of 40 feet towards the south, which lent itself admirably to the terrace gardens.

The principal entrance was in Exhibition Road and we are told "it was constructed of wood on a plan of great economy."

The Council room was most elaborate, its sides being formed of Columns and Pilasters of Roman Doric, surmounted by Cornices from which the arches sprung.

The Conservatory was 270 feet long, 100 feet wide and 15 feet high and was built of glass and iron. The ornamentation was statuary, Mosaic work and bronze figures, whilst the pavement and floors were all works of art.

Among the many beautiful plants grown, we find Norfolk Island Pine, *Eugenia myrtifolia*, *Rhododendron arboreum*, Camphor, India Rubber, sensitive and Cotton plants, with standard Lilacs, and *Laurustinus*.

A series of semi-circular tables for plants, which had been put along the front walls, are worthy of notice. They were an improvement on the old plan of long narrow tables, having the advantage of allowing a greater number of visitors to gather round them at one time.

The heating was by hot water, the pipes being under gratings in the floor.

Many other features of the garden were of interest, the Band houses, the famous Well, the Cascades, the Appold Pump, the Fish Hatcheries, the Maze and the great tent 300ft long by 120ft wide and supported on two immense masts.

Kensington, however, was a liability far beyond the Society's resources and, with a decreasing membership, affairs went from bad to worse and the garden was closed in 1887.

February 1888 saw a new Council elected with Sir Trevor Lawrence as President and the Rev. Wm. Wilks as Secretary.

At the close of 1887 the Society was in debt £1152 and the total number of Fellows was 1329, of whom only 773 were subscribing Fellows and 556 Life Fellows, whose contributions had all been spent at Kensington.

Such was the state of affairs at the close of 1887 when the newly elected Council and officers undertook the apparently hopeless task of rescuing the old Society and reconstituting it upon its original and purely horticultural basis.

With the relinquishment of the Kensington Garden came the resignation of 221 Fellows, leaving only 552 subscribing members.

There was much controversy at this time as to what was to be done with Chiswick.

Here is the resolution which sent it on its way. This was proposed by my old friend Mr Malcolm Dunn, Head Gardener to His Grace the Duke of Buccleuch at Dalkeith Palace.

"In view of the great public advantages that have accrued from the previous Conferences held in the Gardens and the marked success of the present one, members of the Executive Committee of this Conference, Fellows of the Royal Horticultural Society and

other Horticulturists here assembled, who are deeply interested in the welfare of the Society and in the important question of developing the progress of scientific and economic horticulture including especially the fruit growing capabilities of the Country, respectfully submit for the earnest consideration of the Council of the Society, the desirability of concentrating the Society's resources, to the utmost extent, upon the maintenance of the Chiswick garden so as to enable it to fulfil its mission as the national exponent of practical and experimental horticulture."

We have now come to the turning point in the Society's history. It was a happy coincidence that brought Sir Trevor Lawrence, Baron Schroder, Rev. Wm. Wilks and Sir Daniel Morris together in the management. No praise is too great for the work these gentlemen put into the Society's affairs and the foundation they laid for the future working.

It was now "Horticulture, Scientific and Practical." Chiswick was carrying on the trials, the offices were at 117 Victoria Street, Westminster and fortnightly Shows were held in the Drill Hall of the London-Scottish Regiment. This part is of particular interest to the writer as it was at this stage that he joined the staff at Chiswick.

Sir Trevor Lawrence, as President, and the Rev. Wm Wilks, as Secretary, carried the burden of their offices for over 25 years.

In 1891 the Budget was balanced and no debts. In 1903 investments were worth £16,500.

The Journal was recommenced in 1888 and has steadily grown to its now important dimension, and is now issued in monthly parts.

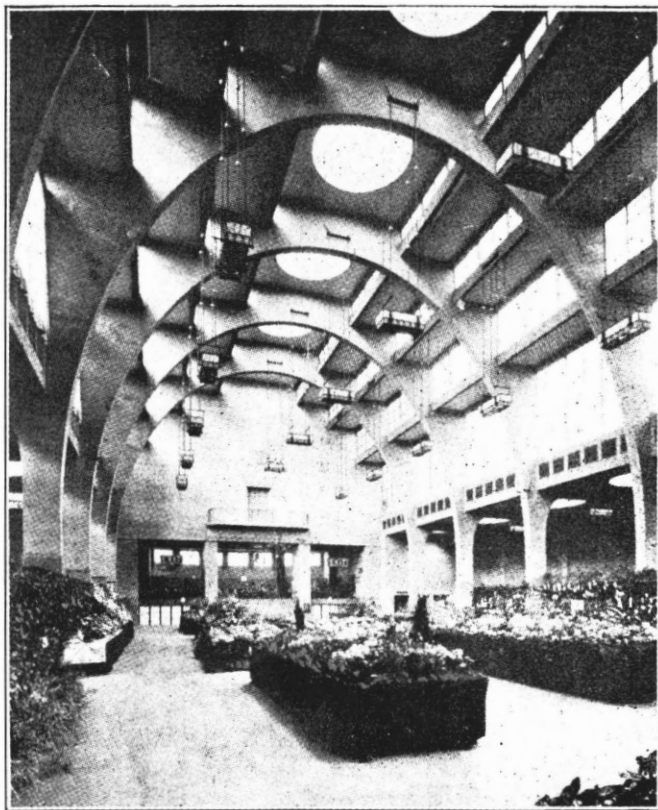
In 1897, with the approval of Her Majesty, Queen Victoria, the Society established a medal in commemoration of Her Majesty's Diamond Jubilee, called the Victorian Medal of Honour (V.M.H.). The original intention was to confine this honour to 60 recipients, but this was extended to 63 at Her Majesty's death to commemorate the years of her reign.

In ten years the membership had doubled and in 1934 it was 29,104, a stupendous figure for any Horticultural Society.

The noble vinery was first erected as a plant conservatory forming the first portion of a grand building in the form of a cross, with a central dome. Its cost was £4500.

In 1857 the pot plants were discarded and a collection of vines planted. Very soon the useless varieties were discarded and the better ones extended to fill the house. Two tons of grapes was the yearly crop.

The ladder employed for gaining access to the grapes deserves a word of mention. This is formed of wrought angle iron and runs on wheels. It is so constructed that the men, in whatever position, are within easy reach of the vines.



THE ROYAL HORTICULTURAL SOCIETY'S NEW HALL.
This was opened in 1928 and shows an improved lighting scheme, mainly from vertical windows instead of from a domed glass roof.

Other features of interest in the garden at this period were the collection of figs, grown in pots, the long house of Gros Colmar grapes and the collection of tomatoes grown in one of the span-roofed houses.

As the Centenary of the Society approached many schemes were put forward for its celebration. Fortune favoured the Society, for it found itself with a new garden and a new hall and offices.

Through the generosity of Sir Thomas Hanbury, K.C.V.O., V.M.H., who purchased the original Wisley garden and gave it in trust for the perpetual use of the Society, they came into possession of a very fine property, to which they have since added two small farms adjoining, making in all 220 acres.

The objects of the Society's garden were: the cultivating of Fruits, Vegetables, Stove, Greenhouse, and especially, Hardy Flowers and Plants; Trees, Shrubs, etc; trials of new and rare varieties of Trees, Fruits, Flowers and Vegetables, against established ones; the hybridization of plants and the raising of new varieties; experiments in the cultivation of plants, of horticultural appliances and materials; the establishment of a School of Horticulture (practical and scientific) and later, the addition of a practical scientific department with Laboratory etc.

The permanent equipment of the garden with greenhouses, frames, living quarters for the staff, etc., had to be undertaken. For instruction and research, provision had to be made. We find the Laboratory work soon out-grew the staff and building and the new Laboratory was erected in 1916 and the staff increased.

This phase of the Society's work seems to have progressed by leaps and bounds. Organized horticultural instruction for students has been developed wonderfully and the development of the garden has proceeded at the same time.

The 1904 hall was officially opened by His Majesty King Edward VII on July 22nd in the presence of a brilliant assembly of 1500 guests.

Baron Schroder, V.M.H., was the prime mover in the erection of this fine building, not only did he give £5000 towards its erection but undertook to defray the whole of the expenses of moving and fitting up the Library.

Sir Trevor Lawrence was the saviour of the Society in 1887 and the presiding genius for 25 years. Sir Thomas Hanbury was the donor of the garden and Baron Schroder the father of the hall. These three names will ever stand out clearly in the history of the great Society.

It is a chapter of recent history that the Society soon out-grew these premises.

The New Hall was opened by her Royal Highness, Princess Mary, Viscountess Lascelles on June 26th, 1928. Though it was only 24 years since the hall in Vincent Square was built, the growth

of the Society had been so rapid and continuous that, for some time, the accommodation available for all concerned had been inadequate.

In design, the hall is novel, the lighting being mainly from vertical windows instead of from a domed glass roof, which has hitherto been the almost universal form of lighting for such an Exhibition Hall. Happily, the prosperity of the Society has enabled the Council to face the financial outlay without an appeal to the generosity of the Fellows.

An outstanding feature in the whole career of the Royal Horticultural Society is the wholehearted support given to it by the Trade. In fact, here is a quotation taken from the 1934 Report:—

“The Council of the Society hopes that the magnificent groups exhibited by the Trade will not deter amateurs from sending up to the meetings of the Society any plants of special interest which they may have growing in their gardens.”

I cannot conclude these notes without apologising for the many omissions which I have had to make, especially in connection with the work of the Society for the last 25 years; it is nothing less than wonderful, namely, the various phases of the work at Wisley, the Shows, the Conferences, the Educational Scheme, and examinations for the National Diploma of Horticulture and the special examination for the British Floral Art Diploma.

The Lecture was illustrated by about 50 Lantern slides depicting those who have been most prominent in all Horticultural activities and also showing the wonderful progress that has been made in all branches of Horticulture.

Mr Waugh is indebted to the following English firms for the use of Photos and Black and Whites from which the slides were made, viz.:

Messrs Allwood Bros.
 Messrs Blackmore & Langdon.
 Messrs Charlesworth & Co. Ltd.
 Messrs Darlington Hall, Ltd.
 Messrs Dobbie & Co., Ltd.
 Messrs C. Engelmann Ltd.
 Messrs L. R. Russell Ltd.
 Messrs Sutton & Sons Ltd.
 The Spalding Bulb Co. Ltd.

and he takes this opportunity of thanking them for their kindly assistance,

THE LACHENALIA AND ITS VEGETATIVE REPRODUCTION.

BY M. J. O'SULLIVAN, B.Sc., AUCKLAND.

Amid the wealth of South African bulbous plants the *Lachenalia* lends itself particularly to cultivation in gardens. The flowers range through red, green, blue, purple and yellow, and very often a delightful orchid-like or peculiar spicy smell, reminiscent of carnations, combines with their brilliance to make them attractive.

However, comparatively few species are cultivated to-day and only four or five species and two or three hybrids are in general horticultural use. The most commonly cultivated species is *L. aurea*, which adds a gay touch to the Auckland spring garden with its upright golden spikes bordering numerous garden paths throughout the city. Only twelve years ago the *Lachenalia* was seldom seen outside greenhouses but to-day even homes, with very little garden, often have a window box or hanging basket, making a golden splash of colour. So popular, indeed, has it become that the bulbs have a very ready sale and there is a definite under-supply in New Zealand at present.

The flower spikes have a medium florists' sale because, although beautiful, they are rather short in the stem, are difficult to arrange, and are rather brittle to handle well. For decorative purposes, they are more often sold as complete plants in pots or hanging baskets where, massed closely together, they make elegant plants when in flower during the winter and early spring months.

To-day the *Lachenalia* is essentially a plant of the Auckland Province and particularly of Auckland City itself, being grown in the South mainly in greenhouses. However, it is doing well outdoors in Hawkes' Bay, and probably will become more popular as it is realised that as far south as Wellington it may be grown successfully outdoors.

THE GENUS AND SPECIES.

The Genus *Lachenalia* is a member of the order Liliaceae and contains about sixty species of South African bulbous plants closely allied to the Hyacinths and Scillas. As early as 1774 it was introduced to Europe by Masson, who brought *L. tricolor* to Kew in that year. In 1787 Jaquin in his "Nova Acta Helvetica" described and recorded 21 species, and, in 1890, Baker, in his "Flora capensis," listed 42 species. To-day 60 species have been discovered and described.

The genus has truncated, egg-shaped bulbs, fleshy strap-shaped leaves, usually one or two in number, sometimes mottled or spotted. The scapes are erect with numerous tubular flowers in which the

three inner segments are often longer than the three outer ones. The flowers may be petiolate and pendulous or sessile and somewhat erect. At present the genus is more widely known by its pendulous species.

There are about 35 species cultivated in botanical collections and, in addition, as many as 50 hybrids, raised mainly by Sir Frederick Moore, Rev. Joseph Jacobs, Rev. John Nelson, Rev. W. Baume, and also a very fine hybrid *L. Pearsoni*, raised by Mr. Aldridge, Curator of Parks, Auckland, in 1922. These hybrids are an improvement on the natural species from a horticultural point of view.

The species and varieties cultivated in New Zealand are:—

L. aurea—leaves broad, fleshy, channelled, spotted with dark purple. Flowers golden yellow, fading to a purplish red; borne on purple spotted scapes up to one foot high. The variety *gigantea* is a much finer plant than the type but is less common. This species is very common in Auckland gardens. In Mount Albert in a few gardens in one locality there is an early flowering variety which comes into bloom at the end of June 6-8 weeks before the type.

L. pendula—discovered in 1789. A very fine species, remarkable for its large bulbs, deep green broad leaves, usually unspotted, but sometimes faintly shaded with brown. Flowers $1\frac{1}{2}$ inches long, orange red lightly tipped with emerald green and purple—borne on scapes 6-12 inches high. A variety *aureliana* has somewhat glaucous leaves and a finer bloom of a better red colour.

This species has, during the last three years, come into more general cultivation, as it is a very fine plant and blooms in May and June, giving a very welcome effect in a winter garden. If grown indoors the colour is much weaker, being almost pink.

L. tricolor—1774—a well-known species (being cultivated since 1779) with broad, fleshy green leaves about 12 inches long, mottled dull purple; 12-20 tubular flowers, red, yellow and green, borne on scapes 12 inches high. The true type is quite common in Auckland and, although not as good as its varieties, is effective. It blooms early in June. The species has many varieties, the best of which are:—

var. *quadricolor*—with red, green and yellow flowers strongly edged with dark purple—very effective and will become much more popular as it is really a beautiful flower. Flowers early in June.

var. *luteola*—with greenish yellow flowers coloured red round the petiole. Rather poor although one of the first cultivated in Auckland. Scapes seldom above 6 inches high. Flowers late—early September.

var. *superba*—a fine variety with large flowers, mostly red—then a thin yellow band followed by green and dark red on the mouth. Resembles *quadricolor* with the red much more prominent and

only a thin band of yellow between the red and green. Uncommon in Auckland. Flowers early in June.

- L. *alba*—leaves lance-shaped, deeply mottled purplish brown. Scapes 9-12 inches high with flowers almost sessile and standing stiffly out with the mouth of the tube higher than the petiolate end. Petals slightly recurved and bluish white in colour fading to a pinkish white. Uncommon in Auckland, as the flower is distinctly unpleasing in general effect. However, if grown in the greenhouse, it is much improved. Flowers late—early October.
- L. *reflexa*—a species with pairs of dark-green deeply channelled leaves recurved and thickened to a horny tip. The yellow flowers are swollen in the middle and almost closed at the mouth. Uncommon in Auckland—flowers early July.
- L. *Nelsoni*—1881—a fine hybrid *aurea* x *tricolor* and named after Rev. John Nelson, who raised it in 1881. It is a free grower and has stout scapes 18 inches high of rich almost tangerine yellow flowers. A very fine plant. It is not really as common as supposed in Auckland as many of the bulbs sold under this name are *L. aurea gigantea*. It flowers in late July and early August, remaining in bloom for at least six weeks.
- L. *Pearsoni*—a very fine hybrid *pendula* (m.) x *Nelsoni* (f.) raised by Mr Aldridge, Curator of Parks, Auckland, 13 years ago, and named by him after Mr. Pearson, then Curator of Parks. The first name suggested was *penisoni*, after the two parents.

It has soft green fleshy leaves loosely mottled purple. The stout scapes are 12-18 inches high with usually 12-20 rich yellow flowers strongly edged with dark red. (This spring in my own garden I had spikes with 48 blooms on them.) It is becoming common in Auckland, rapidly being second in use to *L. aurea* to-day. Flowers mid-July.

Other species are grown but only in one or two rock gardens by enthusiasts such as Mrs. J. W. Tattersfield.

CULTURE.

The majority of Lachenalias are found in South Africa in loose sandy loam with varying proportions of humus. *Pendula*, for example, is found in almost pure sand in open sun but *tricolor* is found in a sandy loam with a fairly high humus content, between large boulders in partial shade. However, under cultivation, a well-drained garden soil with plenty of water during the growing season and a dry spell at ripening time, will be satisfactory for all species grown in New Zealand. However, in clay soils, humus and well-rotted manure should be incorporated and a little sand placed beneath each bulb. The bulbs should be planted from the end of January to the beginning of March, not more than 1 inch deep and from 3—4 inches apart both for borders and massed beds. For border work they are made more attractive by planting in

association with blue grape hyacinths (*Muscari botryoides*) putting the *Muscaris* in front with the *Lachenalias* 4—5 inches apart in a row 6 inches behind.

For bedding they may be used 6—7 inches apart with *Felecia bergeriana* as a groundwork.

About two months after flowering, the leaves begin to die off rapidly and the bulbs should be lifted in early December and stored in a dry shed. If left in the ground, a wet spell will cause them to rot and also, as they are rather shallow planted, they are very easily damaged by the fork in weeding in the summer time. They must have a fine dry spell for good ripening. If the room is needed, they may be lifted after flowering and ripened off slowly in a moist spot in the vegetable garden. In England and in parts of New Zealand, they are grown entirely under glass. Although potting is not necessary in a large part of the North Island, it is often done for decorative effects. The best time to pot is about the end of January, using a compost of 2 parts fibrous loam, 1 part leaf mould, 1 part well-rotted cow or sheep manure, to which is added enough silver sand to make the whole porous. The compost is then thoroughly mixed. From 6—10 bulbs, according to size, may be placed in a 5-inch pot, covering with $\frac{1}{4}$ inch of soil. The bulbs may also be planted in flattish pans, in window boxes or in hanging baskets. In the latter case, the baskets must be lined with moss to prevent the soil dropping out and the bulbs planted all round so that, when growing, the whole basket is hidden and has the appearance of a ball of foliage and flowers. After potting or basketing, the soil is well watered to settle it and the plants are placed in a cold frame or greenhouse. Until growth has fairly started the soil should be kept just moist, the supply of water increasing or decreasing afterwards according to growth or the state of the weather. The plants need a minimum temperature of 45°F. for good growth, so they must be protected in cold areas. When the flower stems are showing, a little weak liquid manure 2 or 3 times a week will be beneficial.

For rock garden work in pockets, 1 part light soil, 1 part fine gravel and 1 part leaf mould, will give excellent results.

REPRODUCTION.

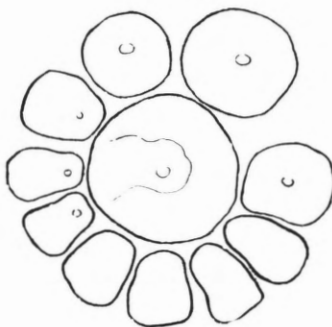
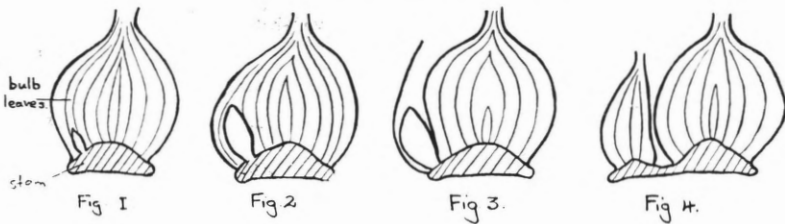
A. Sexual—from seed.

The small blackish, shiny seed may be sown when thoroughly ripened or in the autumn in pots or pans. A rich, gritty soil is best, with the seeds sown very shallow, and covered with sand or light soil. A temperature of 60-65°F. should be maintained. When large enough to handle easily, the seedlings should be pricked out into other pots or boxes and grown on in a sunny place near the glass when established. Usually flowering bulbs are produced from glass seed in three years but some will flower in two years. By extending the growing season with careful watering, I have had seedling plants flower the first year, but this is very unusual.

In Auckland few flowers of most *Lachenalias* with the exception of *L. pendula*, are fertilised and then only one or two flowers on a spike. This spring, there is not one fertile seed pod on 200 *L. Pearsoni* in my garden, but the *L. pendula* average 3 or 4 fertile pods to each plant.

The seed pods commence to develop after flowering is over but proper development is soon arrested in most cases, probably due to unsuitable climatic conditions. However, *L. pendula* ripens seed freely. As *Lachenalias* readily ripen seed under glass and cross very easily [Mr. Aldridge says he has successfully crossed *Lachenalias* and *Scillas*] there is a very fine opportunity for hybridisers to raise new varieties. The rapidity with which most *Lachenalias* divide, however, makes the raising of the commoner species from seed quite unprofitable. Therefore, the propagation of *Lachenalias* from seed should be carried out only for raising hybrids or for raising the uncommon species, the seed of which may be obtained from South Africa.

A single division of a lachenalia bulb



View of divided
bulb from above.

Fig. 5.

B. Vegetative—natural—by division.

i. NATURAL—by division.

This is of two types:—

(a.) BY THE DEVELOPMENT OF BUDS IN THE AXILS OF THE FLESHY
LEAVES INTO SINGLE BULBS.

(a). Usually this takes place only in the axils of the outermost leaves. See figures 1, 2, 3 and 4. These bulbs are always fairly large, about $\frac{1}{2}$ in. diameter, and if there are only one or two of them to the main bulb each will give a good flower the next season. Some large bulbs give as many as ten of these division bulbs (see Fig. 5), but in this case they are usually clove-like in form owing to the lack of room. The number of bulbs formed in this way varies with the species and with the type of soil. It is found that bulbs grown in light well-drained soils divide much more freely than in heavy or badly-drained soils. Some species, too (e.g., *aurea*, *tricolor*, *Nelsoni*) divide much more freely than others (e.g., *luteola*, *pendula*, etc.) This probably accounts for the relative commonness of the first three species. In addition, if not lifted and separated annually, bulbs divide very

slowly in the second and succeeding years. Care should be taken in separating division bulbs from the parent, as the true basal stem of the *Lachenalia* is torn away from the bulb very easily.

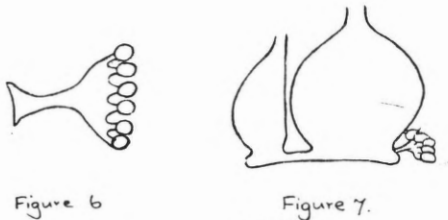


Figure 6

Figure 7.

(b.) DIVISION BY SMALL BULBS ON THIN FLAT SUBSIDIARY STEMS.

Small bulbs are also formed in large numbers on thin flat subsidiary stems from the first node on the basal stem of the parent bulb. They are always very small, not much bigger than a sweet pea seed, very numerous and easily detached. They are borne and held exactly as with the cormels on the gladiolus. (See figures 6 and

7.)

Both types of division are found on most bulbs.

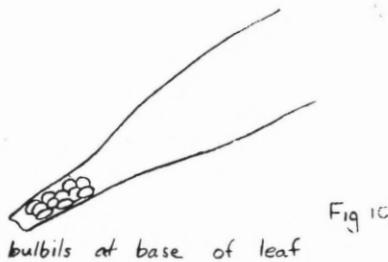
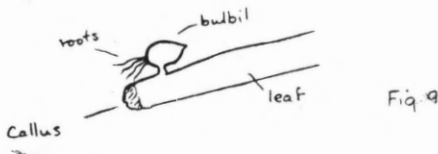
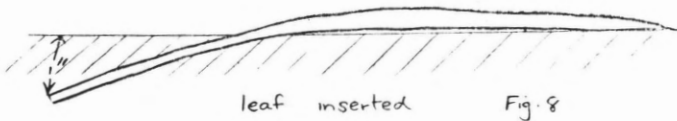


NATIONAL CONFERENCE ON HORTICULTURE, AUCKLAND, 1936.

C. Artificial vegetative.

Four years ago I found that pieces of leaves that I had cut off and partially buried in cultivating my Lachenalias had developed small rooted bulbs just above the cut. This prompted me to carry out a series of experiments in the three succeeding years. A brief summary of the results is given in the following pages. In searching for available material for information on this topic I find that the fact that leaf cuttings will root is recorded in the *Journal of the South African Botanical Society*, 1931.

The propagation by cutting the bulb had been suggested to me by its close relationship to the hyacinth, which has been increased in this way for many years. It will be found in the following pages that a prediction made in the Presidential Address to the Propagators' Guild of Edinburgh in 1904, that lilies will be propagated from even the tiniest piece, is amply borne out for the Lachenalia, a member of the Liliaceae.



(a).

BY LEAF CUTTINGS.

Experiments which I have carried out over a period of three years give results which suggest that the following method is the most satisfactory for obtaining bulbs from leaf cuttings:—

A whole leaf, with a little of the petiola attached, should be taken just after the flower is at its best and placed on the surface of the soil with the stem end lightly buried. A good compost as for potting should be used but leaves will strike quite well in a shady position outdoors. Within four weeks, 10 to 20 tiny bulbs develop on the upper surface of the leaf just above the cut. (See figs. 8, 9, 10.) These bulbs quickly root and within a fortnight become a little larger than sweet-pea seeds, after which the leaf withers and dies. By careful watering the growing period can be extended and larger bulbs obtained. The larger of these bulbs grow very rapidly next season and have produced small flowers within ten months of the cutting being taken. It should be noted that the leaf does not actually root. Tiny bulbs are also produced at the base of the flower stalk in the same way if it is inserted as a cutting.

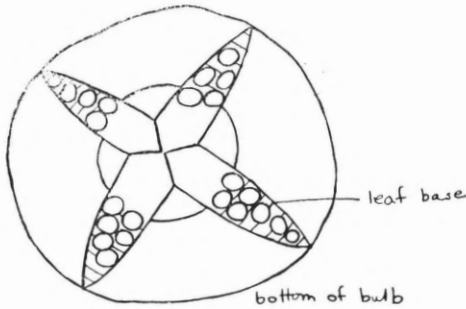


Fig. 11.

Lachenalia bulb cut to produce bulbils

(b)

BY INCISION OF BULBS.

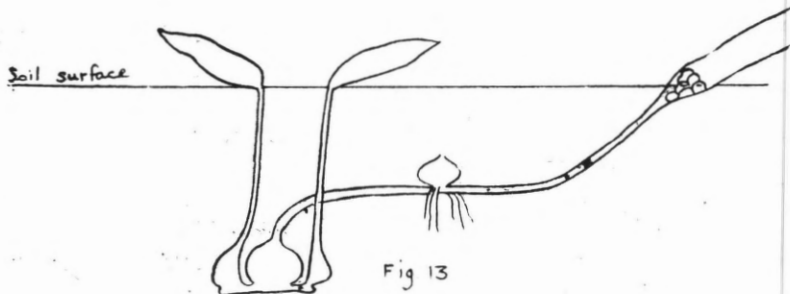
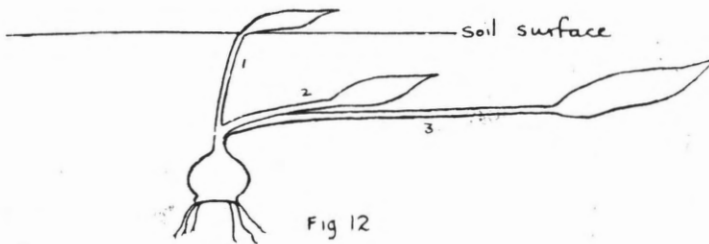
This method was partially suggested to me by the fact that several bulbs, that had had the true stem torn out in handling, developed bulbils between the bases of the fleshy leaves of the bulb.

Bulbs were taken in December and incised—

- (1) With four full cuts dividing the base of the bulb into eight segments.
- (2) With three full cuts dividing the base into six.
- (3) With two full cuts dividing the base into four.

And all were then placed on a cool dry shelf. The cuts became full of tiny bulbs developed at the edges of the leaves. (See Fig. 11.)

In the first and second cases they were irregular in shape and not plump, but in the third case they were plump and round with an average of twenty-four to the bulb. These were taken out the following February and grown on, flowering in two years. The adult bulbs suffered very little and flowered well. Better results were obtained the next year by storing the cut bulbs with the cuts uppermost in silver sand.



C. (c) By bulbs produced on the leaf stem.

The ease of propagation found in the previous experiments and the slightly superior results with the stem attached to the leaf suggested to me experiments with a larger amount of petiole secured by covering the leaf as it developed. The bulb was planted 2 inches deep and, as the tip of the leaf appeared, the soil was cleared down to the bulb and the stem and tiny leaf bent over horizontally and reburied. (See Fig. 12.) By continuing this I was able to get petioles up to 12 inches long.

In 1932 I layered *L. aurea* leaves in this way and found on lifting that I obtained one or two commercial sized bulbs ($\frac{1}{2}$ in. diam.) on each petiole with an average of six bulbils at the base of the leaf. (See Fig. 13.) The bulbs on the petiole were well-rooted but the bulbils at the base of the leaf were not.

In 1933 I extended this experiment to *L. Nelsoni*, *L. pendula*, *L. tricolor luteola*, and found the same results were obtained as in the previous year with *L. aurea*; also that *Nelsoni* propagated exactly as *aurea* but that *pendula* and *luteola* gave better results, giving an average of four commercial sized bulbs on the stem and eight bulbils at the bottom of the leaf. The leaf bulbils were rooted in only one case and then only the bottom one. In addition, the usual division took place at the main bulb.

In 1934, I carried on the experiments, enlarging the field of survey but using only two species of *L. aurea* as a free dividing type, and *L. pendula* as a naturally shy dividing type. The experiments were as follows:—

1. 6 bulbs were planted normally, 1 inch deep as controls.
2. 6 bulbs of each species (2) were planted and bent sideways, as in the previous experiments, to produce a long petiole.
3. 6 bulbs of each were planted 2 inches deep and laid on their side, to make the laying sideways of the stem easier.
4. 3 bulbs of each were treated as in No. 3 but, as the stem lengthened, it was nicked with a knife every inch to retard movement of elaborated food to the parent bulb.
5. 3 bulbs of each were treated as in No. 3 and Superphosphate of Lime was sprinkled along the stem.
6. As for No. 5, using Sulphate of Potash.
7. As for No. 5, using Sulphate of Ammonia.

I found that:—

In experiment 1. *L. aurea* gave an average of four large division bulbs and eight bulbils at the main bulb.

L. pendula gave only 5 division bulbs to the 6 main bulbs and 23 bulbils.

In experiment 2. *L. aurea* gave an average of 4 bulbs and eight bulbils to the main bulb and 2 new bulbs and 5 bulbils on the stem and base of the leaf.

L. pendula gave 6 bulbs and 22 bulbils to the 6 main bulbs but gave an average of 4 bulbs and 6 bulbils to the stem and leaf.

In experiment 3 *L. aurea* gave a slight increase on expt. 2.

L. pendula the stems were 14 inches long and there was an increase of the number of commercial-sized bulbs on the stem—an average of 6 compared with an average of 4 in expt. 2. (See Fig. 14.)

In experiment 4 there was no difference in results from expt. 3.

In experiment 5 there was no difference from expt. 3, except that the stem bulbs and bulbils at the base of the leaf were strongly rooted.

In experiments 6 and 7 there was no appreciable difference from expt. 3.

It will be seen therefore that:—

1. All Lachenalias form extra bulbs on the stem and leaves if layered horizontally.
2. The naturally shy dividers propagate artificially better than the naturally free dividers.
3. Planting the bulb sideways allows the stem to be lengthened, giving a greater increase.
4. The larger bulbs on the layered stem are near the base of leaf.
5. Manuring has little effect but this experiment was not conclusive as my garden is exceedingly well manured and probably was not deficient before the addition of the manures to the Lachenalias.
6. The bulbs produced on the stem were rounder and of better shape than many of the division bulbs of the large bulbs.

JOURNAL OF N.Z. INSTITUTE OF HORTICULTURE.

GENERAL CONCLUSIONS.

1. Lachenalias are deserving of more use in horticulture.
2. Lachenalias prefer a sandy soil with good drainage and plenty of moisture in the growing season.
3. Lachenalias may be propagated from seed readily but this pays only for the rarer species.
4. All Lachenalias increase by division, some more freely than others.
5. Lachenalias may be propagated artificially by leaf cuttings, cutting of the bulb and layering of the leaf stems.

SUMMARY OF PROCEEDINGS OF THIRTEENTH ANNUAL CONFERENCE.

Held in the Biological Lecture Theatre, University College, Auckland, on Wednesday, 4th March, 1936, at 10 a.m.

REPORTS.—The following reports were received and adopted:—

1. Executive (with Statement of Accounts).—See Journal of January, 1936.
2. Examining Board.—See Journal of January, 1936.
3. Action on Remits, etc., passed at the 1935 Conference.

ELECTION OF OFFICERS, ETC.—

President: F. J. Nathan, Esq., Palmerston North, was unanimously re-elected.

Vice-Presidents: Messrs. T. L. Lancaster (Auckland), C. W. Corner (Hawkes Bay), J. G. MacKenzie (Wellington), P. Black, (Palmerston North), T. Rigg (Nelson), J. A. McPherson (Canterbury), D. Tannoek (Otago), and Sir R. A. Anderson, C.M.G. (Southland).

Executive Committee: Mrs. Knox Gilmer, Professor H. B. Kirk, Dr. W. R. B. Oliver, Messrs. A. H. Cockayne, J. A. Campbell, T. Waugh, F. S. Pope, B. C. Aston, W. K. Dallas, W. C. Hyde, W. S. Mason, F. J. Shanks, T. C. Brash, Herbert J. Poole, E. Phillips Turner and A. McMillan.

Hon. Auditor: Mr. J. L. Arcus (re-appointed).

Hon. Fellow: Professor A. P. W. Thomas (Auckland).

Honorary (Overseas) Members: Viscount Bledisloe (formerly Governor-General of New Zealand), Lydney Park, Lydney, Gloucestershire, England, and Alister Clark, Esq., "Glenara," Bulla, Victoria, Australia.

PRESIDENT'S ADDRESS: The President, in an interesting address, reported the complete success of the Institute's educational scheme, which now enables employers to secure the services of gardeners who have proved their ability by the passing of the Institute's horticultural examinations. The possession of the Institute's Diploma in Horticulture is now the "hall-mark" of New Zealand gardening. Reference was made to the citrus industry, and practical suggestions were put forward regarding the canning of fruit and vegetables, asparagus being particularly mentioned. It was thought that the canning of these and also the growing of mushrooms commercially would result in worth while industries.

REMITTS ADOPTED.

1. (a) EDUCATIONAL: "That the Government be urged to provide increased facilities for the training of the youth of the Dominion in the practice of horticulture."

1. (b) "That the Government, the Education Department, and the Senate of the University of New Zealand be urged to provide for the teaching of Botany and General Experimental Science in all post-primary schools on the same or a preferential footing to Chemistry and Physics, and to make the necessary provision to enable the change to be made."—Remit deferred and Executive Council empowered to deal with the matter when the policy of the new Government is disclosed.

2. HONORARY FELLOWS: "That two Fellows be elected annually from Dominion residents."

DISTRICT COUNCILS:

3. "That the rules under the heading of "District Councils" be amended by adding the following: (h) 'In the event of a District Council discontinuing its activities, any surplus after the payment of its liabilities shall be paid over to the Dominion Treasurer.'"

4. "That the District Councils' capitation be increased."—Left to Executive Council to see what can be done.

5. MEMBERSHIP: "That consideration be given to ways and means of retaining and increasing the membership of the Institute and that all Horticultural Societies, Beautifying Societies and kindred organisations be urged to affiliate."—Referred to Executive Council to get into touch with District Council as to the best means of giving effect to the remit.

7. NATIONAL FLOWER SHOWS: "That the District Council sharing the control of any National Flower Show, be entitled to one-half of the Institute's share of any profits therefrom."—Referred to Executive Council with a recommendation that consideration might be given to "one-third" instead of "one-half."

8. SEEDSMEN'S AND FLORISTS' CERTIFICATES: "That the attention of all concerned be directed to the date of expiry of the time for receiving applications for these certificates, viz., the 1st June, 1936."

9. NOXIOUS WEEDS: "That the Government be urged to deal with the problems of ragwort and other noxious weeds as a National effort."

10. TRIALS: "That the Institute is prepared to endeavour to arrange, with the co-operation of Public Gardens and Nurserymen, for a service of systematic competitive trials of new varieties of plants and for the issue of reports thereon."

11. CITRUS RESEARCH: "That the Government be urged to recognize the work done by the Citrus Committee of the Institute by making adequate provision for the continuation of the investigations carried out under their direction."—Left in the hands of the Executive Council.

12. RESEARCH: "That the Institute is prepared to take steps to represent to the Government's scientific service, the urgent need for scientific research into horticultural problems. If this is agreed to, reports on same will be distributed to all affiliated societies."

13. TREE PROTECTION: "That the Government be requested to make legislative provision protecting our trees from the unaesthetic onslaughts of the Electric Power Boards and other authorities and that the affixing of trade signs to trees on the road be prohibited."

14. INFORMATION SERVICE: "That consideration be given to the provision, to affiliated bodies and members, of information service regarding plant identification, plant protection and horticultural matters generally."

15. SEED INDUSTRY: "That the Canterbury District Council considers seed growing in New Zealand of selected kinds would be profitable, and should be encouraged, and suggests that the Government should be asked to promote the furtherance of the seed growing industry.

FOREST PRESERVATION:

16. "That the Institute suggests to the Government the desirability of including at each of the major tourist resorts, e.g., Queenstown, Hanmer, Waitomo, Rotorua, Te Aroha, Tongariro, an adequate and well constructed garden suited to the cultivation of a representative collection of the indigenous flora of the district.

The advantages of such gardens would be:—

- (a) Overseas visitors could then see in cultivation many of the rarer species which at present can only be seen with difficulty in their natural habitat.
- (b) New Zealanders would be able to become better acquainted with the native flora and thus take a keener interest in its preservation.
- (c) Seeds from these plants could be collected and distributed to other Public and Botanic Gardens in New Zealand and abroad.
- (d) Perpetuation would be assured of species which at present are liable to become extinct."

NOTE.—It is felt that such a garden would be more in harmony with the natural surroundings than some of the present gardens devoted mainly to the cultivation of exotics.

17. "That the Government be requested to include in "The Native Plants Protection Act, 1934," a clause preventing the decoration of streets, halls, etc., with native flora."

19. "That the Government be again urged to set aside the Waipoua Kauri Forest as a Sanctuary for all time."

18. "That the Government be again urged to provide for:—
(a) The re-constitution of the Scenery Preservation Board. (b) The appointment of an Inspector of Scenic Reserves.

20. "That the attention of the Government be drawn to the urgent necessity for the preservation of all native forests on hill country, particularly on watersheds, with a view to scenery preservation, prevention of floods, conservation of hydro-electric supplies and of food for birds."

21. "That the Government be asked to amend "The Public Reserves, Domains and National Parks Act, 1928," by defining a National Park, and to declare it a Sanctuary from exotic plants and animals."

—Remits 18, 20 and 21 were amalgamated, and Mr. E. Phillips Turner and the Dominion Secretary were appointed to confer thereon and submit a recommendation to the Executive Council for reference to the Government.

22. That the Government be requested, in its forthcoming legislation, to provide:—

- (a) For any local authority to grant exemption from rating of bush or forest of scenic value facing any main highway, railway, river or seashore, by the deduction of the value of such bush or forest from the value of the whole property.
- (b) For the prevention of the destruction of bush or forest facing any new road or railway or newly designated main highway, pending inspection for the Scenery Preservation Board, but of not less than ten chains in depth or to the nearest ridge crest.

24. That the Government be urged to undertake a classification of all land in New Zealand at present covered with standing bush, with a view to the prohibition of further clearing:

- (a) In all cases where such clearing would be detrimental to surrounding areas; and
- (b) In all other cases except when satisfied that the land so cleared will be economically utilised.

OTHER BUSINESS.

CONDOLENCE: The President referred to the loss sustained by the Institute through the death of Mr. G. A. Green, Dominion Organiser, who was mainly responsible for the position now held by the Institute. A motion recording the Conference's regret and sympathy was passed, and directed to be conveyed to Mrs. Green and her family.

LODER CUP: Mr. G. W. Wright, of Auckland, detailed his original meeting with Gerald Loder (now Lord Wakehurst) in England when the Loder Cup was actually handed to him by the donor for the Institute as the controlling body of horticulture in New Zealand. Mr. Wright stated that the cup was passed on to the High Commissioner merely for safe custody and transmission to New Zealand. He could not understand, therefore, how the Cup had come to be vested in the Minister of Agriculture. Mr. Wright was then informed that the cup was received by the Hon. Mr. Coates when in London and, on his return to New Zealand, was vested by the Government in the Minister of Agriculture, that the donor was aware of this and had been advised of the original conditions of the competition and of their amendment, and also that the Judges' Reports of each competition had been sent to him, so that he was quite aware of the position.

The following resolution was passed:—"That is be a recommendation from the Conference to the Minister of Agriculture that the original intention of the donor of the Loder Cup in its awarding be adhered to, and that he take the necessary steps to give effect to the donor's original wishes."

SEED INDUSTRY: Reports from Messrs Tannock, Black, Kingsbeer and Barnett, members of the committee set up by the Executive Council, were received and adopted. It was mentioned that each of the districts in which seed-growing had been tested has special facilities for growing certain seeds, and it was finally resolved: "That the viability of seeds in different localities should be more thoroughly investigated."

LOCATION OF NEXT CONFERENCE ON HORTICULTURE: Invitations were reported from Christchurch, Napier and Oamaru. Auckland extended an invitation for 1940 (Centenary) and Mrs. Knox Gilmer, on behalf of Wellington, for the same year. It was decided to appoint a committee to meet a committee from the New Zealand Horticultural Trades' Association.

BANKS LECTURE.

The Banks Lecture for 1936 was given by T. Waugh, Esq., Lower Hutt, Wellington, who chose for his subject, "A Brief History of the Royal Horticultural Society." The lecturer dealt interestingly with his subject, comparing the early history of the R.H.S. with that of the Institute. A number of lantern slides graphically illustrated the lecture, of which a copy appears in this issue.

NATIONAL CONFERENCE ON HORTICULTURE.

The sixth National Conference on Horticulture held in Auckland consisted of the gathering of the Institute, the New Zealand Horticultural Trades' Association, the Horticultural Seedsmen's Association of New Zealand, and the Association of Directors of Parks and Reserves. The National Conference was officially opened by the Hon. P. Webb, and the delegates were given a civic welcome

by Councillor (Miss) Melville on behalf of his Worship the Mayor. After the annual meetings of the bodies mentioned, the National Flower Show was held in the Racing Club's buildings at Ellerslie Racecourse, a wonderful setting. The Show was a fine display and concluded with a Floral Fete, which attracted a very large attendance, half of the gate takings of the latter being devoted to the Crippled Children's Fund. Delegates, including the ladies, enjoyed many pleasant outings, garden visits and social functions.

INSTITUTE NOTES.

EDUCATIONAL—1935 EXAMINATIONS: The following passes were recorded:—Junior Certificate: Messrs H. G. Gilpin and D. C. MacKenzie (Christchurch), A. F. Morgan (Timaru) and A. J. Silvester (Bulls). Intermediate Certificate: Messrs M. R. Boothby (Dannevirke) and F. J. E. Jollie (New Plymouth). Diploma: Messrs J. Bennett (Wellington), T. S. Buxton (Palmerston North), W. M. Hamilton (Wellington), J. G. C. MacKenzie (Hastings) and M. J. O'Sullivan, B.Sc. (Auckland).

It is interesting to note that excellent training for the Institute's students is being provided by Messrs. Duncan and Davies of New Plymouth. The firm has secured a position for Mr. Jollie, mentioned above as having obtained the Intermediate Certificate, at the Royal Botanic Gardens, Kew, England. The firm is taking a Kew student in exchange and another student employee has been placed with a nursery firm in England, also on an exchange basis. Apart from this, several Institute students are still receiving their practical training with the firm.

SENIOR CERTIFICATES IN FLORISTS' ART have been granted to the following: Miss C. Clist (Auckland), Mrs. N. M. Daily (Invercargill), Miss A. Ferguson (Auckland), and Mrs. A. E. McPherson and Miss L. A. McPherson (Nelson). Several more recent applications have not yet been finalised.

SEEDSMEN'S AND FLORISTS' CERTIFICATES: Seedsmen and Florists with the necessary service and experience are reminded that applications for the relative certificates cannot be accepted after the 1st June next.

SOUTHLAND DISTRICT COUNCIL: At a recent meeting of the Southland District Council, a motion of appreciation and thanks to Mr. G. M. Broughton, for his valuable services as Hon. Secretary over a long period, was recorded, and members spoke in the highest terms of the good work carried out during his term of office. A vote of appreciation of the services being rendered by his successor (Mr. B. P. Mansfield) was also carried.

EXAMINATION PAPERS, NOVEMBER, 1935.

JUNIOR EXAMINATION (Syllabus No. 1).

HORTICULTURAL BOTANY.

(Time allowed—Three Hours).

Note.—*Six only* of the following questions are to be answered, including No. 8, which is compulsory:—

Use diagrams to illustrate your answers when you can do so.

1. Describe transpiration, expiration and carbon assimilation and how are they connected with growth.
2. Describe the structure of a pollen grain and an ovule, and give some account of fertilisation.
3. Give the internal structure of a typical dicotyledonous stem and compare it with a monocotyledonous one.
4. Describe with sketches the seed and mode of germination of a bean and an onion.
5. What is meant by a dominant character and a recessive character, and what significance have they in the production of new varieties of sweet peas?
6. Describe the main features of the natural order Solanaceae.
7. How are ferns monocotyledons and dicotyledons distinguished from one another.
8. Describe in technical language the specimen supplied (Antirrhinum.)

JUNIOR EXAMINATION (Syllabus No. 1.)

PRINCIPLES OF PLANT PROTECTION.

(Time allowed—Three Hours).

Note.—*Six only* of the following questions are to be answered. Use diagrams freely.

1. Give the general morphology and life history of a moth and an aphid.
2. Give the general morphology and life history of a downy mildew, a powdery mildew and an agaric.
3. Outline the spray programme necessary to control black spot and codlin moth in apples.
4. Compare colloidal sulphur and lime sulphur and under what conditions should each be used.
5. Describe the methods for bulb disinfection.
6. How can crop management be exercised to lessen disease.

7. Detail the soil moisture conditions in relation to temperature in glass-houses favourable and unfavourable for disease development.
8. What do you know of steam sterilization of soil in the growing of tomatoes and cucumbers?

INTERMEDIATE EXAMINATION (Syllabus No. 2.)

PRINCIPLES OF HORTICULTURE.

(Time allowed—Three Hours).

Note.—*Six only* of the following questions are to be answered.

1. Describe the main properties of the chemical fertilisers in general use; the conditions under which the different fertilisers may be used to advantage; also the conditions under which they may be harmful to plants.
2. Under what conditions would you apply fertilisers by means of broadcasting or drilling before planting and side-dressing afterwards. Describe rather fully the best time and method of applying to the land the better known fertilisers.
3. A soil may have poor physical properties and biological condition. What are those commonly met with and how would you improve them?
4. What are the general principles governing pruning?
5. What are the conditions which have to be considered when making a list of trees and shrubs for garden planting? Describe a plant association naturally suited to any special locality with which you are acquainted.
6. Young plants of all kinds when planted out require nursing until they become established. What are the principal attentions required by young trees, shrubs, climbers and herbaceous plants?
7. How are virus diseases carried over between seasons and infection transmitted? What are the main lines of control?
8. What are the general principles underlying the propagation of hardwood plants by means of cuttings?

INTERMEDIATE EXAMINATION (Syllabus No. 2.)

PRACTICE OF HORTICULTURE.

(Time allowed—Three Hours).

Note.—**ANY THREE ONLY** of the following questions to be answered, also **ANY THREE ONLY** of the questions on the Special Subject nominated.

1. Describe the respective merits of the different motor machines, with which you are acquainted, made for lawn mowing or soil cultivation or orchard spraying.
2. How should one select and erect a pump and motor for the economical use of water in an artesian or other kind of well.

3. Describe the preparation, planting and maintenance of a system of shelter belts for orchards and gardens in your district or any locality subject to occasional strong winds.
4. Describe the methods used in propagating apple, peach, and lemon trees. Discuss the respective merits of the stocks now in use for each kind.
5. Write a critical review of the methods commonly adopted in pruning either apple trees or both rose trees and hydrangea plants.
6. Write a short essay on lime-sulphur and its use for plant spraying for the control of disease.

INTERMEDIATE EXAMINATION (Syllabus No. 2.)

Special Subject: THE FLOWER GARDEN IN ALL ITS ASPECTS.

(Time allowed—Three Hours, including "Practice of Horticulture.")

Note.—THREE ONLY of the following questions are to be answered, also THREE ONLY from the paper on "Practice of Horticulture."

1. Show by diagram a grouping of shrubs for colour effect, stating names of shrubs and time of flowering.
2. Give a list of bulbs suitable for planting under the shade of deciduous trees.
3. How would you grow sweet peas for show or cut flower purposes? State names of suitable varieties.
4. How would you maintain a succession of cut flowers for the twelve months of the year?
5. Discuss methods of pruning roses (bush and climbing), brooms, lilacs, and hydrangeas.
6. Name six species of *Liliums*, describing their special features and cultural requirements.

INTERMEDIATE EXAMINATION (Syllabus No. 2.)

Special Subject: NURSERY MANAGEMENT.

(Time allowed—Three Hours, including "Practice of Horticulture.")

Note.—THREE ONLY of the following questions are to be answered, including No. 1, which is compulsory, also THREE ONLY from the paper on "Practice of Horticulture."

1. Give your views on the advantage of specialising, within limits, on Nursery stock production in New Zealand and state what you would consider suitable associations of crops for economical management. Give reasons for your selection.
2. Describe how you would produce a crop of one of the following, namely, Crocus, Tulip, Hyacinth, Narcissus under the headings:

- (a) Selection of planting stock.
 - (b) Planting, depth, etc.
 - (c) Subsequent cultivation.
 - (d) Harvesting.
 - (e) Storing.
3. It is desired to raise a crop of standard Roses. What is the procedure?
 4. Name twelve Conifers that can be economically propagated from cuttings and six that can be advantageously grafted.
 5. Discuss methods of maintaining fertility in nursery land.

INTERMEDIATE EXAMINATION (Syllabus No. 2.)

Special Subject: GLASSHOUSE MANAGEMENT.

(Time allowed—Three Hours, including "Practice of Horticulture.")

Note.—THREE ONLY of the following questions are to be answered, also THREE ONLY from the paper on "Practice of Horticulture."

1. It is desired to grow Tulips, Hyacinths, Narcissus and Freesias in pots; state the type of bulb selected for best results; time of potting and subsequent treatment; also time of flowering and the varieties you would select.
2. How would you prepare liquid manure: (a) from animal refuse and (b) from chemical manures? State proportions of the different ingredients required of the latter to give a stated percentage of nitrogen, phosphoric acid and potash.
3. Give a detailed outline of production of crop of one of the following, viz., Cucumbers, Tomatoes, or Grapes.
4. Give treatment for control of damping-off fungus, mildew on grapes, red spider, thrips and green fly.
5. What are the principles governing the grafting of evergreen trees and shrubs under glass in Spring?
6. What are the chief advantages of sterilised soil and how is it prepared?

DIPLOMA EXAMINATION (Syllabus No. 3.).

THE PRINCIPLES AND PRACTICE OF HORTICULTURE.

(Time allowed—Three Hours).

Note.—Six only of the following questions are to be answered.

1. What is the best flavoured variety of plum or peach or cheery or pear grown in your district, and how is it produced to perfection?

2. Describe the commercial production from seed of cut flowers of any two of the following plants: Iceland Poppies, Anemones, Ranunculus, Freesias.
3. Describe a selection and arrangement of rhododendrons or roses to be grown for display. Include a description of the site, its preparation and planting.
4. What are the main points to be observed in making a lawn in your district? How would you maintain a close cut green for hard play?
5. What conditions are suitable for and how would you produce commercial crops of asparagus and celery?
6. Describe fully the different ways in which roses are propagated.
7. Write a short essay on the commercial production of cyclamen or tomatoes under glass.
8. How would you treat a valuable tree in which, through neglect, serious decay had become established?

DIPLOMA EXAMINATION (Syllabus No. 3.).

Special Subject: FRUITGROWING.

(Time allowed—Three Hours).

1. What are the different methods of ploughing an orchard? Under what conditions would you employ them? Give details.
2. Describe the soil in an average orchard in your district. What implements and machinery would you recommend for a 10 or 20-acre orchard there? Who are the makers and what is the present cost?
3. What are the most suitable soils and subsoils for apple trees, pear, peach, plum, apricot, cherry, citrus and fig trees? What bearing has climate on the question of planting these trees on land that is otherwise suitable?
4. What stocks are used at present for the above-mentioned fruit trees, and what is the character of each?
5. When and how would you re-work middle-age trees of the above kinds to new varieties, supposing it to be necessary?
6. Draw a plan in pencil showing the arrangement for planting a 5-acre block of stone fruit trees for commercial cropping in your district, giving the names of the kinds and varieties recommended and showing their position,

DIPLOMA EXAMINATION (Syllabus No. 3.).

Special Subject: TREES AND SHRUBS, TOGETHER WITH THEIR PROPAGATION AND USE IN HORTICULTURE.

(Time allowed—Three Hours).

Note.—*Six only* of the following questions are to be answered.

1. Name six of the newer brooms with brief description of each and state when and how these should be propagated; also your method of pruning.
2. Name one or more flowering trees or shrubs which will flower respectively in each of the twelve months of the year.
3. Write a short essay on the genus *Magnolia* and state how you would recognise the different groups into which it is divided.
4. Name twelve shrubs suitable for planting in a dry situation and make brief remarks on each.
5. It is desired to plant a border of flowering shrubs. Show by diagram with the names how you would place the different plants selected: (a) for colour effect and (b) for height.
6. Describe in detail your method of propagating Roses, including the raising of stocks.
7. Detail your method of propagating Japanese coloured maples, and, if grafted or budded, state what kinds of stocks you would use and how you would raise them.

DIPLOMA EXAMINATION (Syllabus No. 3.).

Special Subject: VEGETABLE GARDENING.

(Time allowed—Three Hours).

1. In selecting land suitable for growing commercial crops of vegetables what are the desirable conditions?
2. What implements and machinery are required for sowing, cultivating and spraying the crops in a market garden of 5 or 10 acres? Give the names of the makers, and present cost of each.
3. What are the usual reasons for poor control of pests and diseases in vegetable crops, apart from absolute neglect?
4. Either write a specification for sinking an artesian well and fitting it with a pump and motor.

OR

- Describe in detail the most suitable system for watering vegetable crops during a prolonged dry period in summer.
5. Give details of an economical and satisfactory method of raising tomato, egg plants and peppers for planting out.

6. Write a full account of the commercial production of early and late green peas; or a succession of cauliflowers and broccoli in your district.

DIPLOMA EXAMINATION (Syllabus No. 3.).

Special Subject: HORTICULTURAL ENTOMOLOGY IN RESPECT OF THE
COMMONER INSECT PESTS PRESENT IN NEW ZEALAND.

(Time allowed—Three Hours).

Note.—*Six only* of the following questions are to be answered.

1. Describe the injury caused by the "potato tuber moth" *Phthorimaea operculella* (*Lita solanella*). Give an account of the control methods you would adopt in regard to it.
2. Name some of the common insecticides and state what types of insects you would employ them against. Give reasons.
3. Give the life-history of the grass grub. Discuss measures of control.
4. Give the life history of a typical Thrips. In what ways are Thrips injurious?
5. Give the life history of a common moth or butterfly.
6. In a field of young mangolds it is noted here and there along the rows that some of the mangolds have been cut off about ground level. What do you suspect, and what methods of control would you recommend?
7. Give the life history of a common aphid. Discuss methods of control.
8. What are the main considerations in connection with insect control in glass-houses.

INDEX

- Accounts, Annual, 1934-35, 63.
Banks Lecture (1936), 66.
Broom, The New Zealand Tree (Martin) 23.
Christchurch Botanic Gardens, Conditions for Trainees at, 61.
Citrus Test Area, Mount Albert, 56.
Daffodil Year Book, 1935, Review, 57.
Dahlia Classification Summary, 55.
Dahlia, The Modern, (Pye), 43.
Examination Papers (November, 1934), 20; (November, 1935), 95.
Ferns, New Zealand, (Oliver, Dr.), 1.
Green, George A., 35.
History of the Royal Horticultural Society, A Brief, (Waugh), 66.
Institute Notes, 22, 41, 62, 94.
Journal, Quarterly Issue of, 18.
Lachenalia and its Vegetative Reproduction, The (O'Sullivan), 78.
Lee's Red Cox Orange Pippin Apple: Plant Registration, 19.
Lilies, (Shanks), 28.
Loder Cup Competition, The, 36, 53.
Martin, B.Sc., W.: The New Zealand Tree Broom, 23.
Mount Albert Citrus Test Area, 56.
New Zealand Ferns, (Dr. Oliver), 1.
New Zealand Institute of Horticulture, 1936 Conference, 40, 89.
New Zealand Tree Broom, The, (Martin), 23.
Oliver, Dr.: New Zealand Ferns, 1.
O'Sullivan, B.Sc., M. J.: The Lachenalia and its Vegetative Reproductions, 78.
Plant Registration: Lee's Red Cox Orange Pippin Apple, 19.
Pye, Arthur C., The Modern Dahlia, 43.
Quarterly Issue of Journal, 18.
Report of Executive Council, 1934-35, 58.
Report of Examining Board, 1934-35, 60.
Reviews: Garden Pests in New Zealand, 18, Daffodil Year Book, 57.
Royal Horticultural Society, A Brief History of the (Waugh), 66.
Shanks, F. J., Lilies, 28.
Trainees at Christchurch Botanic Gardens, Conditions for, 61.
Waugh, T.: A Brief History of the Royal Horticultural Society, 66.

NEW ZEALAND INSTITUTE OF HORTICULTURE

(INCORPORATED.)

Patrons: Their Excellencies VISCOUNT GALWAY, Governor-General
and LADY GALWAY.

Vice-Patron: The Hon. the Minister of Agriculture.

President: F. J. NATHAN, Esq., Palmerston North.

Hon. Editor: Dr. W. R. B. OLIVER, Dominion Museum, Wellington.

Dominion Secretary: G. S. NICOLL, P.O. Box 1237, Wellington

Hon. Secretaries of Local District Councils:

Auckland: Miss E. F. Kibblewhite, 4 Charlton Avenue, Mount Eden.

Canterbury: J. N. McLeod, 108 Paparoa Street, Papanui, Chch.

Otago: D. Tannock, Botanic Gardens, (Acting).

Southland: B. P. Mansfield, Box 51, Invercargill.

Membership:

Individuals: 12/6 per annum (including Member's wife).

Juniors under age eighteen: 2/6 per annum.

Societies, Firms, etc., 21/- per annum.

Journal (quarterly):

To Members: Free.

Examinations:

Examinations are held yearly in November.

Students desiring examination should make early application to

DOMINION SECRETARY,

N.Z. Institute of Horticulture,

P.O. Box 1237, Wellington.